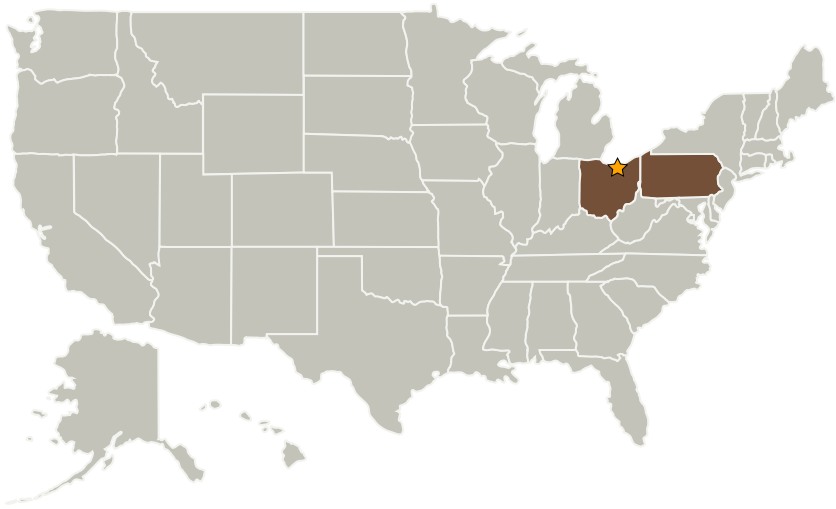
Photovoltaic Wire, Phase I

Completed Technology Project (2005 - 2005)

Project Introduction

This Small Business Innovation Research Phase I project will investigate a new architecture for photovoltaic devices based on nanotechnology: photovoltaic wire. The device comprises an array of silicon nanowires about an aluminum core in a p-i-n junction structure. High conversion efficiency (> 20%) devices can be realized as a result of the high broadband absorption of the nanowire array structure arising from quantum dot-like effects using the periodicity of the nanowires in the array. This innovative device will make it possible to weave large two and three-dimensional photovoltaic panels that are light weight, can be stored in a small enclosure and have high power density in excess of 1000 W/kg. In addition, photovoltaic fabric power arrays can be directly integrated into many spacecraft subsystems such as space suits, instrumentation and solar propulsion systems. The low cost, high volume manufacturing processes used to build photovoltaic wire will allow the technology to be incorporated into a wide array of consumer applications in addition to high-end space systems.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Illuminex Corporation	Supporting Organization	Industry	Lancaster, Pennsylvania

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Primary U.S. Work Locations	
Ohio	Pennsylvania

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

John Steinbeck

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.1 Photovoltaic